

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

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1. REPORT DATE (DD-MM-YYYY) 10 MAR 2014	2. REPORT TYPE FINAL	3. DATES COVERED (From - To) 1 SEP 2010 - 31 Aug 2013
4. TITLE AND SUBTITLE Evaluation of a Professional Practice Model in the Ambulatory Care Setting		5a. CONTRACT NUMBER N/A
		5b. GRANT NUMBER HU0001-10-1-TS18
		5c. PROGRAM ELEMENT NUMBER N/A
6. AUTHOR(S) Siaki, Leilani, PhD, RN, LTC, AN, USA		5d. PROJECT NUMBER N10-C04
		5e. TASK NUMBER N/A
		5f. WORK UNIT NUMBER N/A
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) The Geneva Foundation 917 Pacific Avenue, Suite 600 Tacoma, WA 98402		8. PERFORMING ORGANIZATION REPORT NUMBER N/A
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) TriService Nursing Research Program, 4301 Jones Bridge RD Bethesda, MD 20814		10. SPONSOR/MONITOR'S ACRONYM(S) TSNRP
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution unlimited		
13. SUPPLEMENTARY NOTES N/A		

14. ABSTRACT

Purpose: Explore effects of implementing a professional practice model (PPM) on optimum care indices in two military ambulatory clinics. **Design:** This 2 x 3 fixed factorial design examined 32 access, continuity, staff and patient satisfaction, and quality care indices in Family (FM) and Internal Medicine (IM) clinics across three time periods. **Sample/Methods:** Nursing staff (n=42) and patients (n=1220) were recruited using non-purposive sampling for the satisfaction questionnaires. Aggregated quality care, access, and continuity metrics from each clinic and selected questions from the Army Provider Level Satisfaction Survey (n=2834) and the Interactive Customer Evaluation (n=4275) were analyzed using descriptive and inferential statistics. Qualitative data from questionnaires were analyzed using content analysis, identifying points convergence, divergence, and complementarity with quantitative data. **Analysis/Findings:** Communication (p=.004), access/convenience (p=.001), see provider when needed (p=.039) and overall satisfaction (p=.015) improved over time. Patient satisfaction was more favorable in FM than IM (Wilk's $\lambda = .982$, $p = .001$). Staff satisfaction improved in FM ($p < .05$) only, RN/MD relationships improved ($F(2, 85) = 19.2, p < .05$) in both clinics. Few quality care metrics improved in either FM (n=2) or IM (n=3). Qualitatively, staff identified significant work turbulence: frequent changes, lack of resources, ineffective leadership communication, management style, staffing, and practice constraints as issues. Furthermore, Patient Centered Medical Home (PCMH) implementation eclipsed PPMs, as nursing staff felt excluded from decision-making. Staff dissatisfaction was mirrored in the patient comments, as patients felt rushed, commenting that staff needed more help. **Military Nursing Implications:** Conduct research and EBP projects to refine nurse-sensitive, outpatient outcome measures, develop a staff satisfaction instrument for use with multilevel nursing staff and assess effects of PCMH teams on nurse-sensitive metrics. Educate leadership and staff regarding change management, effective communication, nurses practicing at the top of their education and training, and interdisciplinary collaboration in the spirit of the IOM report.

15. SUBJECT TERMS

professional practice model, outpatient outcome measures, staff satisfaction, nurse-sensitive metrics

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT UNCLASSIFIED	b. ABSTRACT UNCLASSIFIED	c. THIS PAGE UNCLASSIFIED	UU	40	Debra Esty
					19b. TELEPHONE NUMBER (include area code) 301-319-0596

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39.18

TriService Nursing Research Program Final Report Cover Page

Sponsoring Institution	TriService Nursing Research Program
Address of Sponsoring Institution	4301 Jones Bridge Road Bethesda MD 20814
USU Grant Number	HU0001-10-1-TS18
USU Project Number	N10-C04
Title of Research Study or Evidence-Based Practice (EBP) Project	Evaluation of a Professional Practice Model in the Ambulatory Care Setting
Period of Award	01 September 2010 – 31 August 2013
Applicant Organization	The Geneva Foundation
Address of Applicant Organization	917 Pacific Ave, Suite 600 Tacoma, WA 98402

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Abstract

Purpose: Explore effects of implementing a professional practice model (PPM) on optimum care indices in two military ambulatory clinics.

Design: This 2 x 3 fixed factorial design examined 32 access, continuity, staff and patient satisfaction, and quality care indices in Family (FM) and Internal Medicine (IM) clinics across three time periods.

Sample/Methods: Nursing staff (n=42) and patients (n=1220) were recruited using non-purposive sampling for the satisfaction questionnaires. Aggregated quality care, access, and continuity metrics from each clinic and selected questions from the Army Provider Level Satisfaction Survey (n=2834) and the Interactive Customer Evaluation (n=4275) were analyzed using descriptive and inferential statistics. Qualitative data from questionnaires were analyzed using content analysis, identifying points of convergence, divergence, and complementarity with quantitative data.

Analysis/Findings: Communication (p=.004), access/convenience (p=.001), see provider when needed (p=.039) and overall satisfaction (p=.015) improved over time. Patient satisfaction was more favorable in FM than IM (Wilk's $\lambda = .982$, $p = .001$). Staff satisfaction improved in FM ($p < .05$ only; RN/MD relationships improved ($F(2, 85) = 19.2$, $p < .05$) in both clinics. Few quality care metrics improved in either FM (n=2) or IM (n=3). Qualitatively, staff identified significant work turbulence: frequent changes, lack of resources, ineffective leadership communication, management style, staffing, and practice constraints as issues. Furthermore, Patient Centered Medical Home (PCMH) implementation eclipsed PPMs, as nursing staff felt excluded from decision-making. Staff dissatisfaction was mirrored in the patient comments, as patients felt rushed, commenting that staff needed more help.

Military Nursing implications: Conduct research and EBP projects to refine nurse-sensitive, outpatient outcome measures, develop a staff satisfaction instrument for use with multilevel nursing staff and assess effects of PCMH teams on nurse-sensitive metrics. Educate leadership and staff regarding change management, effective communication, nurses practicing at the top of their education and training, and interdisciplinary collaboration in the spirit of the IOM report.

Word count without headings: 296

TSNRP Research Priorities that Study or Project Addresses**Primary Priority**

Force Health Protection:	<input type="checkbox"/> Fit and ready force <input type="checkbox"/> Deploy with and care for the warrior <input type="checkbox"/> Care for all entrusted to our care
Nursing Competencies and Practice:	<input type="checkbox"/> Patient outcomes <input checked="" type="checkbox"/> Quality and safety <input checked="" type="checkbox"/> Translate research into practice/evidence-based practice <input checked="" type="checkbox"/> Clinical excellence <input type="checkbox"/> Knowledge management <input type="checkbox"/> Education and training
Leadership, Ethics, and Mentoring:	<input type="checkbox"/> Health policy <input type="checkbox"/> Recruitment and retention <input type="checkbox"/> Preparing tomorrow's leaders <input type="checkbox"/> Care of the caregiver
Other:	<input type="checkbox"/>

Secondary Priority

Force Health Protection:	<input type="checkbox"/> Fit and ready force <input type="checkbox"/> Deploy with and care for the warrior <input type="checkbox"/> Care for all entrusted to our care
Nursing Competencies and Practice:	<input checked="" type="checkbox"/> Patient outcomes <input type="checkbox"/> Quality and safety <input type="checkbox"/> Translate research into practice/evidence-based practice <input type="checkbox"/> Clinical excellence <input type="checkbox"/> Knowledge management <input type="checkbox"/> Education and training
Leadership, Ethics, and Mentoring:	<input type="checkbox"/> Health policy <input type="checkbox"/> Recruitment and retention <input type="checkbox"/> Preparing tomorrow's leaders <input type="checkbox"/> Care of the caregiver
Other:	<input type="checkbox"/>

Progress Towards Achievement of Specific Aims of the Study or Project

The purpose of this evidence-based program was to explore effects of implementing an evidence-based professional practice model (PPM) on nurse satisfaction and nurse-sensitive indicators of quality care in a military ambulatory setting. Professional practice models provide the scaffolding to support healthy work cultures that facilitate the design and delivery of optimal care and patient outcomes (American Association of Colleges of Nursing [AACN], 2002; Hoffart & Woods, 1996; Girard, Linton, & Besner, 2005). The Army Nurse Corps (ANC) embedded a PPM in its philosophy of care, the Patient CaringTouch System (PCTS) (Horoho, 2011). Essential elements of the PCTS PPM identified in the literature and by subject matter experts included: professional nursing values and ethics, interdisciplinary collaboration, differentiated practice, shared governance, and employee recognition (Table 1). Family (FM) and Internal Medicine (IM) outpatient clinics implemented the PPM guided by the Iowa Model of Evidence-Based Practice over a three-year period 2009-2012. During implementation, outpatient clinics Army-wide transitioned to patient centered medical homes (PCMH). The PCMH are provider-focused while the PPM is nursing centric. Specific aims of this project were:

1. Evaluate levels of nursing satisfaction (Essentials of Magnetism-II [EOM-II[®]]) and patient satisfaction (Patient Satisfaction 18-item Questionnaire [PSQ-18], Army Provider Level Satisfaction Survey [APLSS], and the Interactive Customer Evaluation [ICE]) in ambulatory care clinics at Tripler Army Medical Center (TAMC) following implementation of a PPM.
2. Evaluate the effects of implementation of a professional practice model on baseline measures of patient satisfaction, nurse-sensitive indicators of quality care as measured by selected National Committee for Quality Assurance health effectiveness and data information set (HEDIS), access to care APLSS measures (Time between scheduling and visit, wait time in clinic, and see provider when needed), and continuity (percent of time seen by Primary Care Manager [PCM] by name and by team) in ambulatory care clinics.
3. Evaluate the relationship between staff satisfaction (EOM II[®]) and patient satisfaction (PSQ-18, APLSS, & ICE) and quality of care (HEDIS & PCM by name/team) outcomes following the implementation of the PPM.

Staff Satisfaction

The 1984 Nursing Work Index questionnaire (NWI) (Schmalenberg & Kramer, 2008) measures work factors which influence nurse satisfaction and are linked to patient outcomes (Aiken et al., 2008). Revisions to the NWI resulted in the EOM-II[®]. The EOM II[®] has eight subscales: Clinical autonomy, working with other nurses who are clinically competent, collegial/collaborative RN/MD relationships, perceived support for education, control of nursing practice, perceived nurse manager support, perceived adequacy of staffing, and patient-centered culture/values. The total EOM II[®] score (sum of weighted subscales) is termed Professional Job Satisfaction and indicates the extent to which staff nurses report/confirm a healthy work environment (appendix A). The total weighted EOM II[®] score, professional job satisfaction, will be the primary focus of the analysis as recommended by the authors and reported in the literature (Kramer and Schmalenberg, personal communication November 2013; Newhouse, Morlock, Pronovost, Colantuoni, & Johantgen, 2009). Scores less than 290 indicate a work environment that needs improvement (WENI), 290-311 indicates a healthy work environment (HWE), and over 311 indicates a very healthy work environment (VHWE) (Kramer and Schmalenberg, personal communication November 2013).

Table 1
Army Nurse Corps Professional Practice Model (PCTS) Tenets Supported by the Professional Practice Model (PPM)

PCTS Tenets	Professional Practice Elements in the literature	Professional Practice Model Tenets
Nursing Ethos Accountability	Professional nursing philosophies and values	Theory of Caring, accountability, and professional ethics; critical thinking, empowerment, shared vision with organizational mission, values, and vision, autonomy over nursing practice
Patient & Family Centered Communication	Interdisciplinary collaboration	Interdisciplinary collaborative relationships, nurse accountable for plan of care in partnership with patients, families, and other members of the healthcare team; patient centered teamwork through communication.
Evidence Based Practice Healthy work environment; Skill building; Staff development	Differentiated nursing practice/care delivery system	Using evidence-based approach to improve standards of care; professional responsibilities commensurate with licensure and scope of practice and skills
Leadership	Management decision making	Shared governance, empowerment of UPCs, coordination with Results Council
Support Healthy work environment	Recognition of nurses' contributions	Supports public and individual recognition for progress towards and achieving goals Supports professional development

For the EOM II[®] scales the highest intercorrelations were found for: (1) Clinically competent peers and values: $r = .75$; (2) Supportive nurse manager and values: $r = .75$; (3) Clinically competent peers and supportive nurse manager: $r = .67$ and (4) Support for education and clinical autonomy: $r = .66$. Demographics for the EOM II[®] revealed that 94.9% worked 8 to 10 hour day shifts whereas 5.1% worked 8 to 10 hour in evening shifts. For highest level of education, 42.9% responded 'other', followed by 22.6% with Baccalaureate (BSN). For years of experience the mean was 8.3 years ($SD = 6.77$, Median = 6).

Patient Satisfaction Questionnaires

The PSQ-18 for ambulatory care has well established validity and reliability with acceptable internal consistency for all subscales (Marshall & Hays, 1994). The seven subscales measured general satisfaction (items 3 and 7); technical quality (items 2,4,6, and 14); interpersonal manner (items 10 and 11); communication (items 1 and 13); financial aspects (items 5 and 7); time spent with provider (items 12 and 15); accessibility and convenience (items 8, 9, 16, and 18). Higher scores (range 1 - 5) reflect satisfaction with medical care. Deleted items on the PSQ-18 were not applicable to a military setting. For example, question seven "I have to pay more for my medical care than I can afford" was removed as there are no out-of-pocket expenses for beneficiaries seen at a military treatment facility. Questions mentioning "doctor" were modified to "provider" as the provider level was not a variable in this study. One open-ended item "Please add any comments you feel will help us improve our service to you", one demographic item, and three yes/no items were added to the survey (appendix A).

For the PSQ-18, 52.3% (n = 638) were from IM and 47.7% (n = 582) from FM. Regarding time, 30.6% (n = 373) were observed at time one, 33.2% (n = 405) at time two, and 36.2% (n = 442) were observed at time three. For the total sample, 43.7% were seen 1-2 times in the clinic the last 6 months, 69.9% knew what healthcare team they are assigned to, 89% knew their primary care providers name, and 26.3% knew their primary nurses name.

The highest coefficient alpha for the PSQ-18 subscales was obtained for Technical Quality ($\alpha = .709$) followed by Accessibility and Convenience ($\alpha = .689$). The rest were $\leq .623$ which warrants some concern about the psychometric properties of these subscales in this sample population.

Army Provider Level Satisfaction Survey (APLSS).

This 24-item survey is managed by the Office of the Surgeon General and sent to randomly selected patients within 48 hours of their outpatient visit throughout the Army Medical Department (AMEDD). Only those questions addressing satisfaction with staff, access, and continuity (n=8) at TAMC were included in this analysis. For example item 11 "The amount of time from when you made the appointment until you actually saw the healthcare provider" was used to evaluate access. The 5-item verbal response scale ranges from strongly disagree to strongly agree. Item 13 "courtesy and helpfulness of the staff during this visit" addresses satisfaction. Response scale for these items are a 5-item likert scale from poor to excellent (appendix A). Data from 2,834 APLSS surveys were analyzed: 37.5% (FM n=381; IM n=682) at time one, 31% (FM n=309; IM n=569) at time two, and 31.5% (FM n=229; IM n=664) at time three.

Interactive Customer Evaluation (ICE) Comment Card.

This Army-wide 16-item general customer satisfaction survey has an online or pen and paper option. Questions are tailored to the unit and results reported to department leaders. The study team had no input with regards to the distribution of this survey as the focus was on professional not business practices. Satisfaction with care is addressed with items such as "Employee/staff attitude" and "Access to medical care" with a 6-item likert type response scale ranging from N/A to excellent (appendix A). Data from 4,272 surveys were analyzed by group (FM n=3595, 84.15%; IM n=677, 15.85%) and time (T-1 n=1968, 46.07%; T-2 n=1209, 28.3%; T-3 n=1095, 25.63%). Survey response rate by clinic differed significantly (FM T-1 n=1350, 37.55%; T-2 n=1162, 32.32%; T-3 n=1083, 30.13%; IM T-1 n=618, 91.29%; T-2 n=47, 6.94%; T-3 n=12, 1.77%). Response rate also varied by question. For example, overall satisfaction at T-1 for FM was n=1255 and IM n=284 whereas at T-1 for the question regarding staff attitude n=1350 in FM and n=617 for IM.

Quality and access measures.

Measures are reported in standard format across all military treatment facilities and include the HEDIS measures, percent of time seen by primary care manager (PCM), and percent of time seen by PCM team. Three questions from the APLSS data, time between scheduling and visit, wait time in clinic, and see provider when needed, comprised the access to care measures. Between notification of funding and the data collection time periods, two access measures, calls answered within 90 seconds and call abandonment rates, and one HEDIS measure, pneumococcal immunization, were no longer tracked and therefore not included in the study. Metrics for HEDIS measures were evaluated by the number of eligible persons that received the treatment. For example, of those eligible for a mammogram, how many received a mammogram? Number of eligible patients varied by metric as noted in Table 2.

Table 2

Number of Eligible Patients by HEDIS Metric, Clinic, and Time

Metric	Family Medicine			Clinic Total	Internal Medicine			Clinic Total	Total
	T-1	T-2	T-3		T-1	T-2	T-3		
Mammogram	955	929	797	2681	1629	1638	1350	4617	7298
Long term asthma medication	86	90	79	255	195	61	90	346	601
Hemoglobin a1c	258	258	210	726	841	817	520	2178	2904
A1c ≤ 9	220	220	178	618	745	727	442	1914	2532
Low-density lipoprotein level ≤ 100	157	158	108	423	598	559	331	1488	1911
Cervical screening	2295	2228	2083	6606	2251	2160	2121	6532	13138
Colorectal screening	912	941	698	2551	2112	2184	1543	5839	8390
Chlamydia screening	411	360	317	1088	288	228	160	676	1764
Adult pneumococcal immunization	241	241	N/A	482	1823	1714	N/A	3537	4019

Qualitative data.

Qualitative data was limited in that respondents were not available for face-to-face interviews. Each instrument included an open-ended question asking respondents to provide comments that would help the clinics improve the care provided. Comments from the APLSS and ICE questionnaires were not available. Written comments from staff (EOM II[®]) and patients (PSQ-18) were analyzed using content analysis (Elo & Kyngas 2007). The unit of analysis was individual sentences, as comments varied in length from one sentence to a full paragraph. After reading through all sentences several times, data abstraction proceeded by each team member individually coding data by group, clinic, and time. The PI compiled results using Atlas ti version 5.2. The PI also constructed definitions for the categories using literary data and memos written by team members about various codes. For example, autonomy was defined as perceived self-control over practice based on terms used by the authors of the EOM II[®] subscale (Kramer, Schmalenberg, Maguire, Brewer, Burke, Chielewski et al, 2008). In a series of meetings over several months, team members revised definitions as needed and condensed over 162 codes into 12 categories and two themes using the definitions as a guide (appendix B). Then the PI assessed qualitative data for points of convergence, divergence, and/or complementarity with quantitative data. Complementarity refers to the use of different data sources to obtain alternate or overlapping views of phenomena. Convergence refers to arriving at shared conclusions from data collected by the different methods such as definitions of constructs and confirmation or strengthening of results thereby increasing the validity of outcomes (Johnson, Onwuegbuzie, & Turner, 2007; Tashakkori & Teddlie, 2003). Almost all categories were bidirectional in that positive and negative comments were applicable to each category. Staff and patient categories included: access, communication, lack of resources, nonclinical issues, quality of care, and satisfaction with care/work environment. Staff specific categories were: autonomy, change,

communication, leadership, and professional practice. Continuity was specific to patients. The overarching theme for staff was satisfaction. For patients, the theme was quality of care (table 3).

Table 3.

Staff and Patient Qualitative Categories and Themes

Category with exemplar	Staff Theme: Satisfaction Staff attitude, perception, or feeling towards work environment or experience (Kalisch, 2010; Peltier, 2009; Schmaleberg 2008)						Patient Theme: Quality of Care Patient perception of interpersonal and technical aspects of care including safety, effectiveness, efficiency, timeliness, equitable, patient centered (IOM, 2001)					
	Internal Medicine			Family Medicine			Internal Medicine			Family Medicine		
	T-1	T-2	T-3	T-1	T-2	T-3	T-1	T-2	T-3	T-1	T-2	T-3
Access: Appointments are not given adequate time	X	X				X	X	X	X	X	X	X
Autonomy: We have a lot of independence and autonomy in our roles	X		X		X							
Change: Too many changes in past six months	X					X						
Communication: Communication about rescheduling is very poor	X	X	X				X	X	X	X	X	X
Continuity: Not able to see same person every time							X	X	X	X	X	X
Lack of resources: Please enable our providers what they need	X	X		X	X	X				X		
Leadership: Whoever is in charge in this clinic needs to be employee of the month	X	X	X			X						
Non-clinical: Parking!	X				X		X	X	X	X	X	X
Professional practice: We've become full time telephone operators	X	X	X		X							
Quality of care: The nurse taking my vitals was courteous and knowledgeable	X	X					X	X	X	X	X	X
Satisfaction w care/work: Everyone is doing great Give them a raise!!	X	X	X		X		X	X	X	X	X	X

Aim one

Evaluate levels of nursing and patient satisfaction in ambulatory care clinics following implementation of a PPM.

Staff Satisfaction. Quantitative data (appendix C) indicated that mean professional job satisfaction scores for FM clinic were higher at T3 and higher when compared with IM clinic. Differences were not significant across clinics by time. However, EOM II[®] scores indicated that FM clinic moved from a “work environment needing improvement” ($m=252.89$) to a “healthy work environment” ($m=308.9$) at T-2, progressing to a “very healthy work environment” ($m=335.13$) at T-3. Internal medicine clinic scores indicated a “healthy work environment” at T-1 ($m=290.81$) and T-2 ($m=297.9$), but dropped to a “work environment needing improvement” ($m= 263.79$) by T-3. However, data must be interpreted with caution due to low sample size.

Although staff satisfaction should be gauged on the composite professional job satisfaction score, summary for two-way ANOVA (group by time) showed that subscales of the EOM generally trended in the same direction as the composite scores as follows:

RN/MD Relationships. Significance was not obtained for the two-way interaction: $F(2, 85) = 2.55, p = .084$ (partial $\eta^2 = .057$). A significant main effect was obtained for time: $F(2, 85) = 19.2, p < .05$ (partial $\eta^2 = .311$, which is a large effect size, meaning that 31.1% of the variability in the outcome is attributable to differences between the three time periods). Collapsing across groups, the 12 month group had the highest mean ($M = 48.68, SD = 6.08$), and the 6 month group had the lowest ($M = 33.64, SD = 10.76$).

Support for Education: Significance was obtained for the two-way interaction: $F(2, 86) = 3.41, p = .038$ (partial $\eta^2 = .073$ which is a medium effect size, meaning that 7.3% of the variability in the outcome is attributable to the two-way interaction). Internal Medicine had very similar scale means for T1 ($M = 11.74$) and T2 ($M = 11.95$) followed by T3 ($M = 10.86$). Family Medicine obtained a relatively higher mean for T2 ($M = 12.57$) and lower for T3 ($M = 11.5$) and T1 ($M = 10.0$).

A significant main effect was also obtained for time: $F(2, 86) = 3.94, p = .023$ (partial $\eta^2 = .084$, which is a medium effect size, meaning 8.4% of the variability in the outcome is attributable to differences between the two levels of time). Collapsing across group, T2 has the highest mean ($M = 12.21, SD = 1.92$) and T1 has the lowest mean ($M = 11.0, SD = 2.45$) though any interpretation of a significant main effect must be approached with caution given the significant result of the first order interaction.

Working with Clinically Competent Peers: Significance was obtained for the two-way interaction: $F(2, 84) = 3.56, p = .033$ (partial $\eta^2 = .078$ which is a medium effect size, meaning that 7.8% of the variability in the outcome is attributable to the two-way interaction). Internal Medicine had similar scale means for T1 ($M = 12.82$) and T2 ($M = 12.37$) and lower for T3 ($M = 11.14$). Family Medicine obtained a relatively higher mean for T3 ($M = 13.17$) and lower for T1 ($M = 11.56$) and T2 ($M = 11.86$).

Clinical Autonomy: Significance was obtained for the two-way interaction: $F(2, 85) = 4.81, p = .011$ (partial $\eta^2 = .102$ which is a medium to large effect size, meaning that 10.2% of the variability in the outcome is attributable to the two-way interaction). Internal Medicine had similar scale means for T2 ($M = 80.63$) and T1 ($M = 79.43$) but quite a bit lower for T3 ($M = 70.0$). The means for FM were more separated, with the highest mean at T2 ($M = 86.57$) followed by T3 ($M = 81.58$) and then T1 ($M = 71.94$).

A significant main effect was obtained for time: $F(2, 85) = 4.44, p = .015$ (partial $\eta^2 = .095$, a medium to large effect size, meaning that 9.5% of the variability in the outcome is attributable to differences between the two time periods). Collapsing across group, T1 ($M = 76.36, SD = 11.44$) and T3 cohorts have similar means ($M = 77.32, SD = 14.72$) compared to the highest mean obtained by the T2 cohort ($M = 83.15, SD = 12.07$) though any interpretation of a significant main effect must be approached with caution given the significant result of the first order interaction.

Control over Nursing Practice: Significance was obtained for the two-way interaction: $F(2, 84) = 8.41, p < .05$ (partial $\eta^2 = .167$, a large effect size, meaning that 16.7% of the variability in the outcome is attributable to the two-way interaction). Internal Medicine had somewhat similar scale means for T1 ($M = 75.59$) and T2 ($M = 73.89$) but substantially lower (although $n = 7$) for T3 ($M = 51.0$). Family Medicine obtained the highest mean for T3 ($M = 82.42$) followed by T2 ($M = 75.64$) and T1 ($M = 71.31$).

A significant main effect was obtained for group: $F(1, 84) = 7.72, p = .007$ (partial $\eta^2 = .084$, which is a medium effect size, meaning that 8.4% of the variability in the outcome is attributable to differences between the two levels of group). Collapsing across time FM has the higher mean ($M = 75.93, SD = 16.74$) than IM ($M = 71.33, SD = 16.37$) though any interpretation of a significant main effect must be approached with caution given the significant result of the first order interaction.

Perception that Staffing is Adequate: Significance was obtained for the two-way interaction: $F(2, 86) = 3.34, p = .04$ (partial $\eta^2 = .074$, a medium effect size, meaning that 7.4% of the variability in the outcome is attributable to the two-way interaction). Internal Medicine had the highest mean at T1 ($M = 17.5$) followed by T2 ($M = 16.33$) and then T3 ($M = 14.86$). Family Medicine obtained very similar means for T3 ($M = 16.58$) and T2 ($M = 16.36$), then lowest for T1 ($M = 14.94$). Neither of the main effects were significant.

Patient Centered Values: Significance was obtained for the two-way interaction: $F(2, 85) = 8.35, p < .05$ (partial $\eta^2 = .164$, a large effect size, meaning that 16.4% of the variability in the outcome is attributable to the two-way interaction). Internal Medicine had the highest and similar means for T2 ($M = 34.44$) and T1 ($M = 33.92$) and lowest for T3 ($M = 28.14$). Family Medicine had the highest for T3 ($M = 37.42$) followed by T2 ($M = 33.07$), then T1 ($M = 29.81$). Neither main effects were significant.

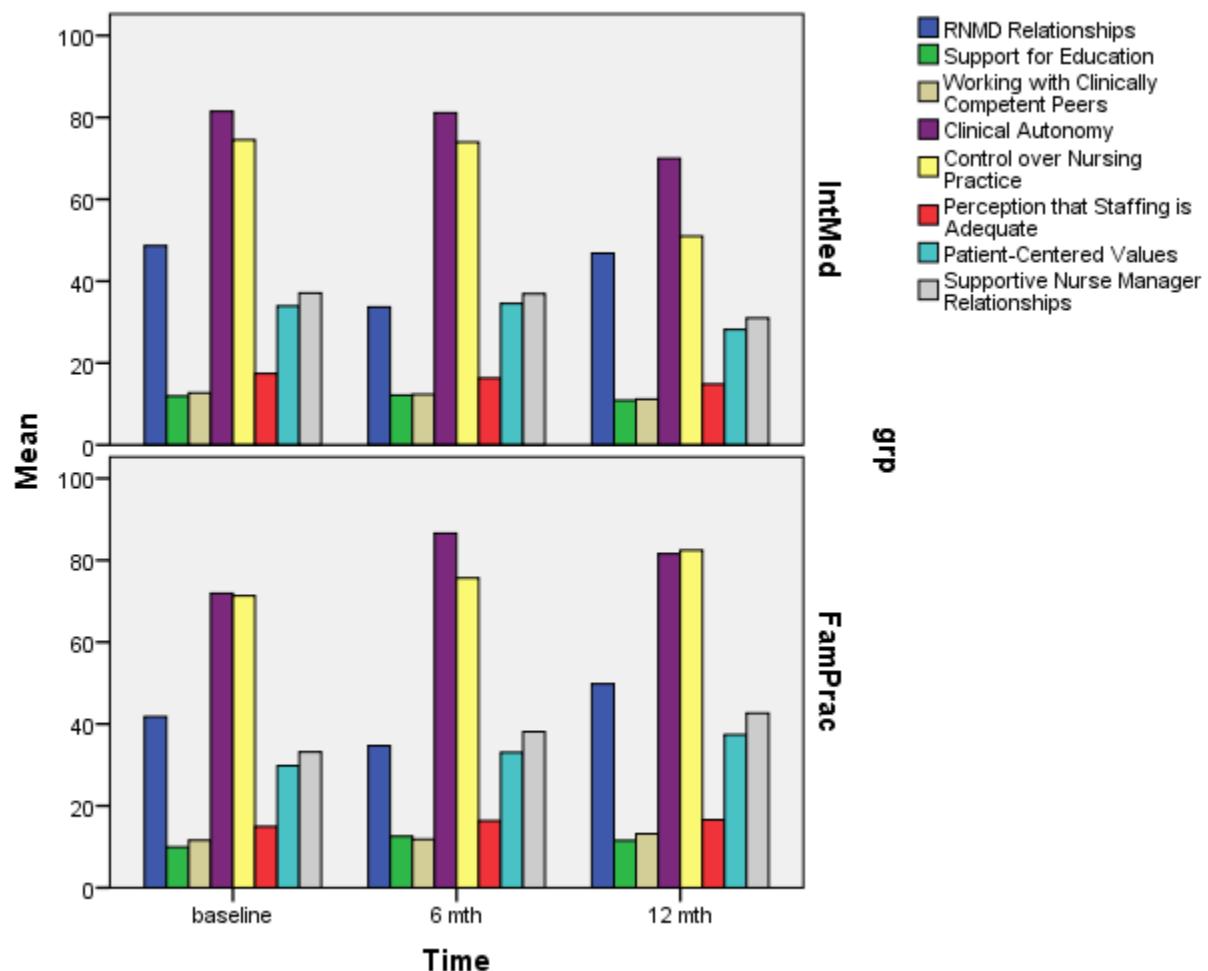
Supportive Nurse Manager Relationships: Significance was obtained for the two-way interaction: $F(2, 85) = 7.8, p = .001$ (partial $\eta^2 = .155$, a large effect size, meaning that 15.5% of the variability in the result is attributable to the two-way interaction). Internal Medicine had very similar scale means for T1 ($M = 36.7$) and T2 ($M = 36.53$) and lower (although $n = 7$) for T3 ($M = 31.0$) whereas FM obtained the highest mean for T3 ($M = 42.67$) followed by T2 ($M = 38.14$) and T1 ($M = 33.19$).

A significant main effect was obtained for group: $F(1, 85) = 4.71, p = .033$ (partial $\eta^2 = .052$, which is a medium effect size, meaning that 5.2% of the variability in the result is attributable to differences between the two levels of group). Collapsing across time, FM has the higher mean ($M = 37.55, SD = 7.63$) than IM ($M = 35.82, SD = 6.78$) though any interpretation of a significant main effect must be approached with caution given the significant result of the first order interaction.

Professional Job Satisfaction: Significance was obtained for the two-way interaction: $F(2, 84) = 11.47, p < .05$ (partial $\eta^2 = .214$ which is a large effect size, meaning that 21.4% of the variability in the outcome is attributable to the two-way interaction). Internal Medicine had the highest mean for T1 ($M = 317.25$) relative to T2 ($M = 297.25$) followed by T3 ($M = 263.79$) whereas FM obtained the highest mean for T3 ($M = 335.15$), then T2 ($M = 308.93$) and then T1 ($M = 284.5$). Neither of the main effects were significant.

A two-way MANOVA was also conducted for the 8 EOM subscales (Figure 1) to ascertain if a group x time interaction was significant for the linear combination of the EOM scales. The group by time interaction was significant: Wilk's $\lambda = .643, F(16, 146) = 2.26, p = .006$ (partial $\eta^2 = .198$). This means that the relationship of group and the linear combination of the 8 outcomes, in part, depends upon the 'time' condition. Similar to the prior univariate analysis, all of the two-way interactions are significant for the outcomes, excepting RN/MD Relationships and for the multivariate model Staff Perception that Staffing is Adequate is now not significant ($p = .052$). The only significant main effect for group was found for Control over Nursing Practice. Significant main effects for the time condition were found for RN/MD Relationships, Support for Education, and Clinical Autonomy.

FIGURE 1: MANOVA results for the EOM



Qualitative data.

One overarching theme, satisfaction, supported categories from both clinics (table 3). Categories were similar in both clinics except for communication and quality of care, which emerged from IM only. Comments in either category were not more positive over time: “*a lack of equipment and support staff has made it very difficult to provide the quality care I feel we should be able to provide*” (IM T-2); “*We need to have an open lines of communication with one another*” (IM T-3).

Access was an issue: “*Appointments are not given adequate time*” (FM, T-3); “*No appointments available have to find way to have see anyway despite the level of acuity for fear of negative ICE Comment*” (IM T-2). Staff in both clinics felt that while they had some autonomy, many decisions were still being made without their input: “*We do have input on the unit practice council and nurse practice, but I feel it is chosen by higher ups what these councils can provide input on and what they cannot*” (IM, T-1); “*Patient care is a top priority here at IMC, but decision is not based on agreed consensus by everyone*” (IM T-3). “*If you want people to act professional treat them as professional and not monkeys doing tasks.*” (FM T-2).

Staff struggled with professional practice yet remained focused on teamwork: “*This place I believe strongly has turned for the worse in which the RN's are nowhere near practicing at the top of our scope.*” (IM T-3). “*Over 50% of what the nurses do could be done by MSAs and NAs*” (IM T-2). “*Difficult to keep staff because everyone is not on the same page, but everyone tries to work as a team.*” (IM T-1). Practice issues were not limited to nurses: “*Medics need to be able to do what our training has taught us not what it is thought we should do*” (FM T-2).

Change was a concern in both clinics: “*Too many changes in past six months*” (FM, T-3); “*Sometimes too many changes at once. Changes are good, however not when it confuses staff.*” (IM, T-1). Resources to deal with changes were felt to be lacking: “*With all the additional tasks and duties given to us, we need to be provided with adequate resources (both staff and equipment)*” (FM, T-3).

Despite these issues, some staff remained satisfied with their job: “*I truly love my job but if only we can have the equipment and good communication system I'll be even more satisfied*” (IM T-2); “*Overall, people in this clinic work well together (for the most part)*” (FM T-3). A complete listing of all categories and comments are in appendix B.

Patient Satisfaction

PSQ-18: For the mean averaged scales for the PSQ-18 (scores range from a low of 1 to a high of 5) the highest mean was obtained for the Interpersonal Manner scale ($M = 4.13$, $SD = .80$) followed by Communication ($M = 4.10$, $SD = .78$) and the lowest mean was obtained for the Accessibility and Convenience scale ($M = 3.68$, $SD = .83$). When conducting the two-way ANOVA (group by time) a significant two-way interaction was found only for Access and Convenience: higher means were obtained at T-3 for both IM ($M = 3.65$, $SD = .84$) and FM ($M = 3.92$, $SD = .84$) compared to T-1 or T-2.

Significant main effects for group were found with higher means in FM than IM for Technical Quality (FM: $M = 3.99$, $SD = .78$; IM: $M = 3.87$, $SD = .72$), Interpersonal Manner (FM: $M = 4.2$, $SD = .79$; IM: $M = 4.07$, $SD = .80$), Time Spent Dr./Provider (FM: $M = 3.89$, $SD = .95$; IM: $M = 3.73$, $SD = .90$), and Access and Convenience (FM: $M = 3.78$, $SD = .86$; IM: $M = 3.59$, $SD = .80$), though interpretation of the significant main effect is subordinated to the higher order significant two-way interaction.

For time, Communication and Access and Convenience have significant between-time differences, with higher means for both scales obtained at T-3 ($F(2, 1189) = 5.45, p = .004$, partial $\eta^2 = .009$ and $F(2, 1185) = 3.83, p = .022$, partial $\eta^2 = .006$ respectively). The very small effect sizes mean that .9% and .6% of the variability in the outcome is attributable to differences between the two time periods. Collapsing across group, for communication, the T-3 group has a higher mean ($M = 4.18, SD = .75$) than T-1 ($M = 4.13, SD = .77$) and T-2 ($M = 4.00, SD = .82$). For access and convenience, the T-3 cohort has the highest mean ($M = 3.79, SD = .85$) than T-1 ($M = 3.69, SD = .83$) and T-2 ($M = 3.57, SD = .81$) though interpretation of the significant main effect is subordinated to the higher order significant two-way interaction.

For simultaneous analysis of all 6 PSQ scales, the two-way MANOVA test of the group x time interaction was not significant: Wilk's $\lambda = .991, p = .55$ (partial $\eta^2 = .005$). The main effect for group was significant: Wilk's $\lambda = .982, p = .001$ (partial $\eta^2 = .018$) and as well for the main effect for time: Wilk's $\lambda = .976, p = .004$ (partial $\eta^2 = .012$). Examination of the univariate results are such that main effects for group are significant for all of the individual outcomes excepting General Satisfaction ($p = .065$) with Family Medicine obtaining higher mean values than Internal Medicine.

APLSS: Items analyzed for satisfaction question were: Overall Satisfaction, Overall Satisfaction with PCM (reported as one score), staff courtesy/helpfulness, overall visit satisfaction, and satisfaction with healthcare overall. Family Medicine was lower at T3 than T1 or T2 for all subscales. Internal Medicine was higher at T3 than T1 or T2 for overall satisfaction, satisfaction with healthcare overall, time between scheduling and visit, and wait time in clinic. Specifically, for the 2 (group) x 3 (time) binary logistic regression, a significant interaction was found for the following:

Overall Visit Satisfaction: there was a slightly higher percent for the FM group at T2 (94.8%) but an appreciably higher percentage (95.1%) for IM when compared to FM (89.4%) for T3 (figure 2).

FIGURE 2: APLSS Subscale Overall Visit Satisfaction

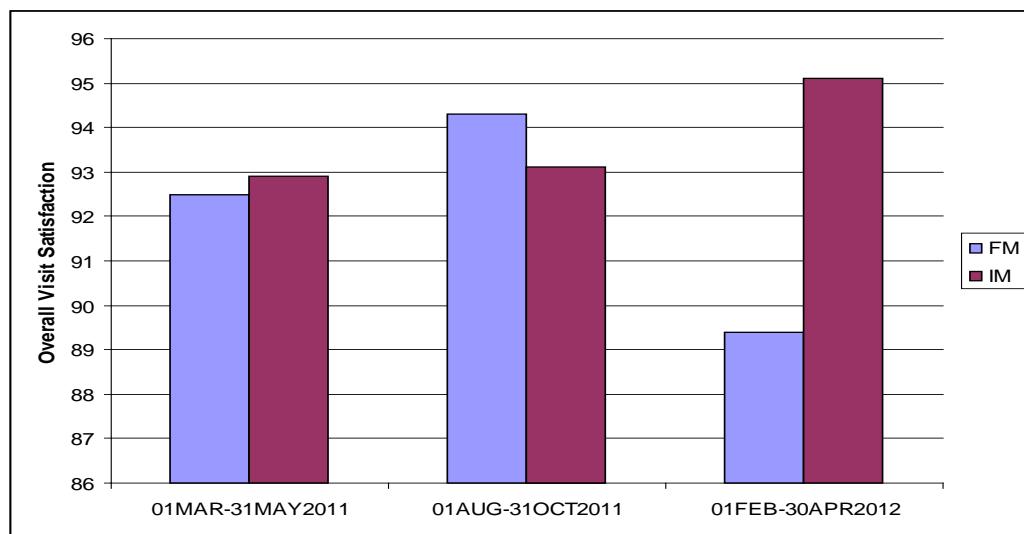
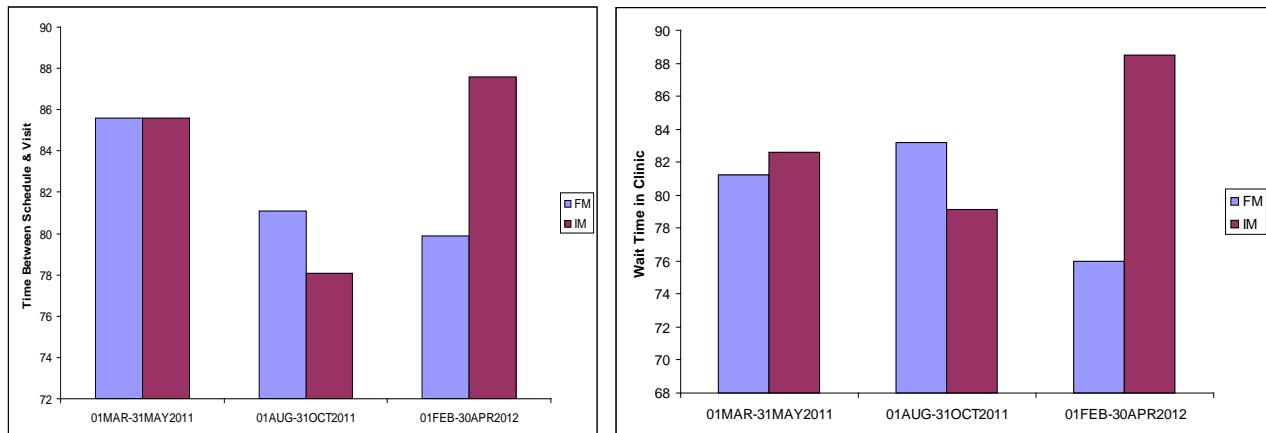
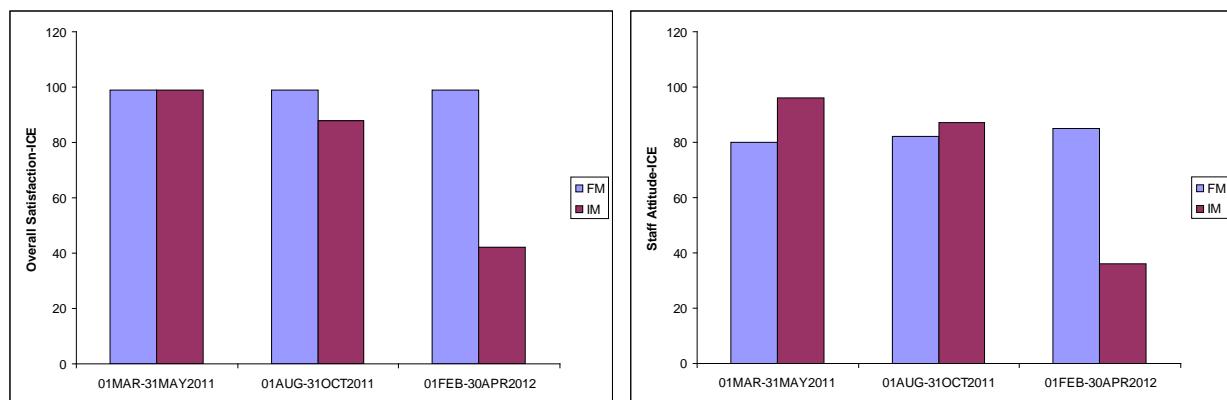


FIGURE 3: APLSS Subscale Time Between Schedule and Visit**FIGURE 4: APLSS Subscale Wait Time in Clinic**

ICE: Items analyzed from this questionnaire were: overall satisfaction, staff attitude, timeliness, quality of care, access to medical care, and referral to specialty care. Sample size was significantly different at T3 for IM than for FM possibly affecting outcomes. A significant interaction was found for all subscales with FM higher than IM at T3 (figures 5-7). FM was higher at T3 than at baseline for all scales except overall satisfaction and referral to specialty care where mean was essentially the same across time. Specifically, for the 2 (group) x 3 (time) binary logistic regression for the ICE subscales, a significant interaction was found for all of the outcomes, though interpretation should be approached with caution given the very large confidence intervals and also the small sample size for the last two time periods for the IM group: **(1) Overall Satisfaction:** the FM group has the same percentage (99%) across all three time periods whereas the IM group sees an appreciable decrease in overall satisfaction for T2 and T3(88% and 42%); **(2) Staff Attitude:** the IM group has a higher percentage than FM for T1 (96% vs. 80%) and T2 (87% vs. 82%) whereas the FM T3 cohort has a higher endorsement of staff attitude than IM (85% vs. 36%);

FIGURE 5: ICE, Overall Satisfaction and Staff Attitude

(3) Timeliness: the IM group has a higher percentage than FM at T1 (93% vs. 77%) and T2 (85% vs. 78%) whereas the FM T3 cohort has a higher endorsement of timeliness than IM (83% vs. 50%); **(4) Quality of Care:** the IM group has a higher percentage than FM for T1 (95% vs. 84%) and T2 (91% vs. 86%) whereas the FM T3 cohort has a higher endorsement of Quality of Care than IM (88% vs. 64%); **(5) Access to Care:** the IM group has a higher percentage than FM for T1 (90% vs. 76%) whereas the FM T3 cohort has a higher endorsement of Access to Care than IM (82% vs. 56%). Both groups have 79% endorsement for T2; **(6) Referral to Specialty:** the IM group has a higher percentage than FM for T1 (89% vs. 81%) and T2 (86% vs. 79%) whereas the FM T3 cohort has a higher endorsement of Referral to Specialty care than IM (82% vs. 33%).

FIGURE 6: ICE Questions Referral to Specialty Care and Quality of Care

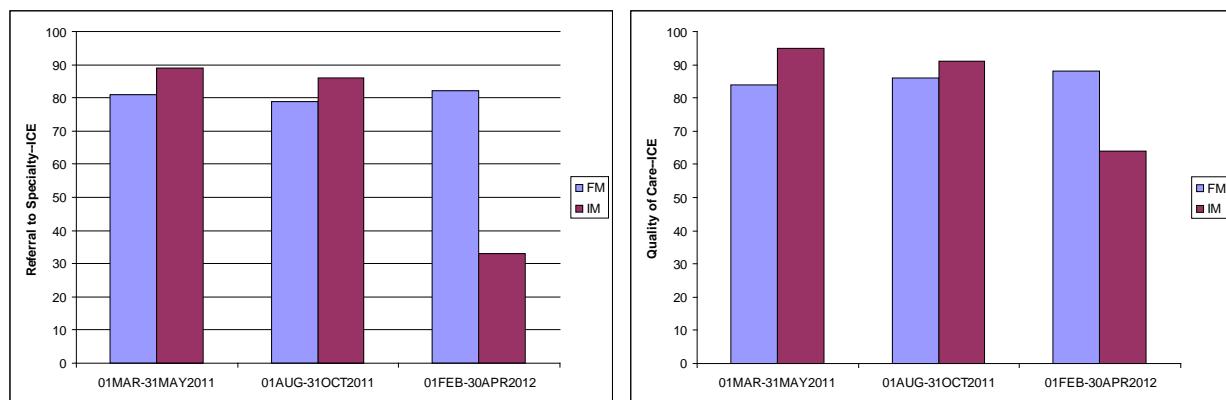
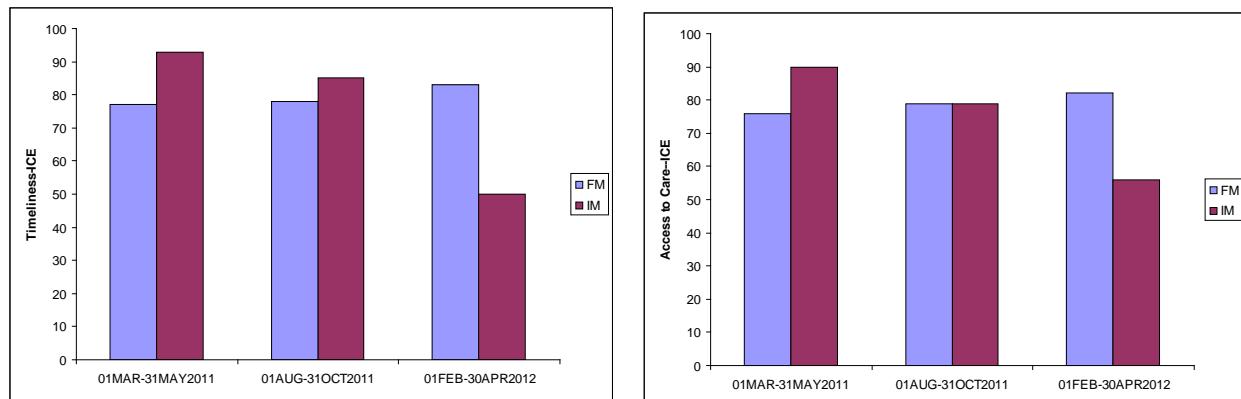


FIGURE 7: ICE Questions Timeliness and Access to care



Qualitative data

Both patient and staff data categorized as nonclinical referred to issues outside of the immediate effects normally associated with outpatient professional practice: parking, inpatient care, pharmacy services, emergency services, and specialty care such as podiatry tended to be negative.

For patients, one overarching theme, quality of care, supported seven categories: access, communication, continuity, lack of resources, non-clinical, quality of care, and satisfaction with care (table 3). Categories were similar in both clinics across all time periods except for lack of

resources, which emerged from FM at T1 only “*Please enable our providers what they need to continue great [sic] care to us*”. Positive and negative comments were obtained in both clinics for all time periods, with negative comments somewhat more predominate across clinics and time periods. Access issues were slanted towards specialty care: “*Difficult or too long to get referrals for specialists*” FM, T1; but also referenced availability “*Hard to get appointments with PCM without waiting 2 weeks*” FM T3, “*its hard when the clinic is so busy and no sick call on weekends*” IM T3; and appointment system “*The appointment line is horrible*” IM T1; Suggestions were made as to how to improve access: “*more providers are needed to accommodate the growing needs of the military*” FM T1; “*Give providers more time to see patients!*” IM T2, “*we need an acute care clinic*” IM T3. Improvements were also noted: “*The new appointment system works efficiently and staff very helpful*” IM T1, “*I like the after hours clinic service, great to accommodate those of us with busy schedules*” IM T2, “*I am accustomed to waiting 20-30 minutes past my appointment time for care. This was not the case for my first visit to this clinic*” FM T2.

Communication addressed system issues, providers, and support staff: “*One system hospital information one way and the other has patient information another way. No one wants to take the time to ensure that all the information is correct*” FM T1, “*Sometimes tests results are explained; usually not unless I ask*” FM T2, “*They should kindly inform you they are behind so you know what to expect*” IM T2, “*When messages are left for doctors or nurses 98% there is not return call to confirm*” IM T3.

Continuity addressed providers, nurses, and the military system: “*why assign patients to a provider they never see?*” FM T1, “*My PCM has changed frequently, but I've grown to expect that with the military*” FM T3, “*Always get an appointment with someone on team*” FM T3, “*I would like to have the same nurse every appointment if possible*” FM T3, “*I'd really like it if I could see the same person all the time*” IM T1, “*Every time I visit – which is infrequent my primary care team changes. Not a problem – just stopped trying to keep track*” IM T3.

Quality of care comments were typically more provider focused: “*My personal opinion is the utilization of Nurse Practitioners at TMC is a point of genius!!*” FM T1, “*I feel I asked all the question. He was not good explaining to me at all*” FM T2, “*Concerned that doctors are more concerned for patients or deployable than finding or fixing patients medical issues*” IM T1, “*These questions depend on the individual doctor as of now Dr. --- is great*” IM T3, “*Ever since being provided with the “white teams” contact phone numbers, I have had quick response to all my inquiries*” IM T3.

Comments regarding satisfaction were more general: “*I am here on R & R as a medic in Iraq it is nice to know my family is medically sound*” FM T1, “*Overall I am very pleased with the service provided by this facility*” FM T2, “*They need to spend more time reviewing patient records and getting to know this patient, this requires time which means providers cannot be overbooked*” FM T3, “*I've seen lots of improvement in medical services/care provided to me*” IM T1, “*Satisfied and thank you*” IM T2, “*I love the treatment I get, but instead of worrying about what good or bad feelings people have about Tripler, we all would better served if people health problems were cured completely*” IM T3. A complete listing of all categories and comments are in appendix B.

In summary, FM staff satisfaction improved over time and over half (7 of 12) of the patient satisfaction measures maintained or met target over time. Internal medicine clinic staff satisfaction declined over time, while more than half (8 of 12) of patient satisfaction metrics maintained or met target over time. Qualitative data provided insight with regards to specific

metrics that did or did not improve. Staff comments addressed overall satisfaction while patient comments targeted quality of care.

Aim two

Evaluate the effects of implementation of a PPM on baseline measures of patient satisfaction, indicators of quality and access to care measures in ambulatory care clinics.

Patient Satisfaction. Please refer to aim one.

Quality care. For the 2 (group) x 3 (time) binary logistic regression for the HEDIS outcomes, no significant group x time interaction was found for any of the outcomes. However, there were significant effects for group and/or time as follows: (1) Mammogram: the IM group had a higher overall percentage of eligible patients with mammogram for each of the time cohorts when compared to FM and for both of the medical groups there was a decrease in percent of eligible patients with mammogram for each of the successive time cohorts; (2) Long-Term Asthma Medication: the FM group has a higher overall percent of eligible patients with long term asthma medication for the last two time cohorts when compared to IM; (3) A1C Testing: the IM group had a higher overall percent of eligible patients with A1C testing for all of the time cohorts when compared to FM; (4) A1C less than or equal to 9: the IM group had a higher overall percent of eligible patients with A1C less than or equal to 9 for all of the time cohorts when compared to FM; (5) LDL less than or equal to 100: the IM group had a higher overall percent of eligible with LDL less than or equal to 100 for all of the time cohorts when compared to FM; (6) Cervical Screening: the FM group had a higher overall eligibility with Cervical Screening for all of the time cohorts when compared to IM; (7) Colorectal Screening: the FM group has a higher overall eligible with Colorectal Screening for the first two time cohorts, though IM has a higher mean value for the last time cohort; (8) Chlamydia Screening: the IM group had a higher overall eligible with Chlamydia Screening for all of the time cohorts when compared to FM; (9) Adult Pneumococcal Immunization: the FM group had a higher overall eligible with Adult Pneumococcal Immunization for each of the time cohorts when compared to IM. The only measure to improve over time was percent of eligible patients with long term asthma medication in FM.

Goals for HEDIS measures change annually based on the population or *N* of participating hospitals nationwide reporting data year to year. Clinics are rated green (optimal), amber, or red if they achieve at least 90%, 75%, or 50% of the goal respectively. Both clinics maintained or achieved green by T3 for chlamydia and cervical screening. Family Medicine also maintained or achieved green status by T3 for long-term asthma medication and IM for colorectal screening (table 4).

Access to care. Specifically, for the 2 (group) x 3 (time) binary logistic regression, a significant interaction was found for: (1) Time between scheduling and visit: the clinics have equivalent percentages for the T1 (85.6%) whereas the FM T2 cohort has a higher endorsement (81.1% vs. 78.1%) compared to the IM T3 cohort which obtains a higher endorsement (87.6% vs. 79.9%); (2) Wait Time in Clinic: the IM group has higher endorsement for the T1 cohort (82.6% vs. 81.2%) and T3 (88.5% vs. 76%) whereas the FM T2 cohort has a higher endorsement (83.2% vs. 79.1%).

Continuity. For PCM by name both FM (T1=50.33%, T2=58.33%, T3=62.67%) and IM (T1=54.67%, T2=55%, T3=62.67%) moved from red or amber status to green ($\geq 60\%$) by T3. For PCM by team FM (T1=91.67%, T2=94.33%, T3=92%) and IM (T1=91%, T2=89.3%, T3=93.67%) maintained green status ($\geq 85\%$).

In summary, Access and continuity measures followed similar patterns as the satisfaction items. Specifically, about half of the metrics maintained or reached target goals by T3 in FM (5 of 10) and IM (5 of 10). Quality of care metrics (n=9) were somewhat less robust in that few metrics in either clinic maintained or reached target over time (FM n=2, IM n=3). Several metrics worsened over time (FM n=3, IM n=2), as noted in Table 4.

Table 4

Status of HEDIS and continuity goals by clinic and time

Metric	Family Medicine			Internal Medicine		
	T1	T2	T3	T1	T2	T3
Mammogram	amber	red	red	green	green	amber
Long-term asthma medication	green	green	green	green	green	amber
A1c testing	amber	amber	amber	amber	amber	amber
A1c ≤ 9	red	red	red	amber	amber	amber
LDL ≤ 100	amber	amber	red	green	green	green
Cervical screening	green	green	green	green	green	green
Colorectal screening	green	green	amber	green	green	green
Chlamydia screening	red	red	red	red	red	red
Adult pneumovax	amber	amber	N/A	amber	amber	N/A
PCM by name	red	amber	green	amber	amber	green
PCM by team	green	green	green	green	green	green

Aim three

Evaluate the relationship between staff and patient satisfaction and quality of care outcomes following the implementation of the PPM.

Quantitative data. Thirty-two items (staff satisfaction n=1, patient satisfaction n=13, quality of care n=9, and access/continuity n=10) were assessed. As discussed in aim one and two, the following measures improved over time and met target goals in FM: staff satisfaction (EOM-II[®]), 5 of 12 patient satisfaction items (PSQ-18, ICE, APLSS), 1 of 9 quality of care items (HEDIS), and 5 of 10 access/continuity items. For IM, measures that improved over time and met goals included 6 of 12 patient satisfaction items and 4 of 10 access/continuity items (table 5). In FM 3 of 12 patient satisfaction items met target levels at T3 but were lower than T1 or T2. Measures with lower scores at T3 that still met target goals in IM included 2 of 12 patient satisfaction items, 3 of 9 quality of care items, and 3 of 10 access/continuity items. Some measures in both clinics met target goals at T1 or T2 but not at time T3 or improved over time but did not achieve the target. Overall, each clinic met or maintained target goals at T3 for about half (FM n=16; IM n=17) of the measures. Qualitative data provided more insight regarding staff and patient perceptions over the course of this project (appendix B). Points of divergence, convergence, and complementarity with quantitative data (table 6) were as follows:

Divergence. The EOM-II[®] scores indicated FM had a very healthy work environment by T3 yet staff comments identified issues such as a lack of resources, time, and leadership support as affecting morale, burnout, and staff retention: *Too much is expected from too little* (FM, T-1); *Burnout for some people is a real issue* (FM T-3); *The female charge nurse is a bully and picks favorites* (FM, T-3); Internal Medicine scores declined from a healthy work environment at T1 and T2 to a work environment needing improvement at T3: *The morale was low at one point but*

I think after all of us voiced our opinions recently, the morale have gotten a little better. Thank you (IM T-3)

Patient satisfaction was higher in both clinics at T3, yet not all patient experiences were positive: there are some experiences that were truly grotesque! (FM T2); Communication about rescheduling is very poor. When messages are left for doctors or nurses 98% there is not return call to confirm about refills or appointments. (IM T3).

Similarly, access/continuity measures met target, but remained problematic for some: Hard to get appointment with PCM in less than 2 weeks time (FM T3); I think we need an acute care clinic. Keep the ER from getting backed up, but it's hard when the clinic is so busy and no sick call on weekends (IM T3)

Few quality of care items met target by T3, yet patient comments were more positive than negative: have never had better care or need more efficient health care providers (FM T2); NP XX and his nurse took time to listen to me and understood my frustrations (IM T3).

Convergence: As previously noted, about half of the metrics met target goals by T3. Both staff and patients indicated progress was being made, but professional practice, access/continuity and quality of care remained opportunities for improvement: We have a lot of independence and autonomy in our roles, but sometimes decisions are made from higher up without our input (EOM-II[®] IM T1); Appointments are not given adequate time (EOM-II[®] FM, T-3); Have no say whatsoever in nursing practice here (EOM-II[®] IM T-3); Keep up the great work that you all are doing, I give all of you a big A+ (PSQ IM T1); I really dislike the fact my primary care doctor can be switched without little to no input from me. (PSQ FM T3); Thank you folks for always making great improvements to service all patients (PSQ IM T3); We have always received the very kindest, most thorough, and attentive care from everyone at Tripler (PSQ FM T2); Thanks for being great Doctors and nurses (PSQ FM T3).

Complementarity. Qualitative data provided a bit more insight regarding satisfaction, access/continuity metrics, and quality of care from staff and patient perspectives: A lot of waste (equipment, time and energy on new ideas because of "command" demands) (EOM-II[®] IM T-1); Decisions that directly affect our ability to do our jobs in terms of logistics, ergonomics, and equipment availability and selection are made with little or no input from staff (EOM-II[®] IM T-3); Overall, people in this clinic work well together (for the most part) (EOM-II[®] FM T-3); I wish I didn't have to see my PCM for OBGYN issues. Distinctly uncomfortable with that (PSQ FM T2); Never is appointment on time – always waiting (PSQ IM T2); Always get an appointment with someone on team (PSQ FM T3); Dr. XX staff are very professional and courteous (PSQ IM T3).

In summary, over half of the metrics tracked in this project improved over time or achieved/maintained target goals by T3. While these results were not as robust as hoped for, both clinics made progress overall in the right direction. Qualitative data was similarly equivocal in that data were bidirectional. Neither positive nor negative comments prevailed and some insight regarding quantitative data results emerged. Staff satisfaction in both clinics centered on lack of resources, change chaos, communication, and practicing to the full extent of their education and training. Patient satisfaction converged around elements of quality care: access, communication, continuity, and technical quality. Both staff and patients were cognizant of progress and identified specific opportunities for improvement.

Table 5

Summary of metrics meeting target goals by time and clinic

Metric	Family Medicine			Internal Medicine			By Time*			By Clinic**	
	T1	T2	T3	T1	T2	T3	T1	T2	T3	FM	IM
Satisfaction											
PSQ	EOM II		X	X	X	X					
	General satisfaction			X		X	X				
	Technical quality			X		X	X			X	
	Communication		X				X				X
	Interpersonal manner					X	X				X
ICE	Overall satisfaction			X	X						X
	Staff attitude	X	X		X						X
	Quality of care				X						X
APLSS	Overall satisfaction		X	X			X	X			X
	Satisfaction w PCM	X			X						X
	Courtesy/respect	X	X	X	X	X	X				X
	Visit satisfaction					X	X				
	Satisfaction w healthcare										X
Access/ Continuity											
PSQ	Access/convenience			X			X	X		X	X
	Time spent with PCM					X	X				X
ICE	Access to care				X						X
	Timeliness		X		X						X
	Referral to specialty		X		X						X
APLSS	Time to scheduled visit										
	See PCM when needed										
	Wait time in clinic		X				X				
Other	PCM by name		X	X			X	X		X	
	PCM by team	X	X	X	X	X	X	X	X	X	
Quality of care											
	Mammogram				X	X					X
	Long term asthma medication	X	X	X	X	X		X	X	X	
	A1c testing										X
	A1c ≤ 9										X
	LDL ≤ 100				X	X	X				X
	Cervical screening	X	X	X	X	X	X			X	
	Colorectal screening	X	X		X	X	X			X	
	Chlamydia screening										X
	Adult pneumovax									X	

Note: *metric met target during time period regardless of clinic; ** clinic with higher mean score collapsed across time regardless whether or not target was achieved.

Table 6

Convergence, divergence, and complementarity

Metric	Family Medicine			Internal Medicine			Exemplar
	T-1	T-2	T-3	T-1	T-2	T-3	
Satisfaction							
EOM-II [®]	X	X	X	X			If you want people to act professional treat them as professional and not monkeys doing tasks (FM T-2) Overall, people in this clinic work well together (for the most part) (FM T-3). Sometimes too many changes at once. Changes are good, however not when it confuses staff. (IM, T-1) Communication is another area that could use improvement. We often find out about new practices in other areas of the clinic as they are happening (IM, T-1) This place I believe strongly has turned for the worse . . .the RN's are nowhere near practicing at the top of our scope. We're full time telephone operators literally (IM T-3)
PSQ	General satisfaction	X		X	X		Lady at front desk for sick call Family Practice needs to be more customer/soldier friendly! (PSQ-FM T1)
	Technical quality	X		X	X		I think with as busy as you are I have seen improvements (PSQ-FM T2)
	Communication	X		X			
	Interpersonal manner			X	X		Everyone is doing great...Give them a raise!! (PSQ-FM T3)
ICE	Overall satisfaction		X	X ^{**}			Thanks I am very happy . . . from the check in desk to the PCM (PSQ-FM T3)
	Quality of care	X*	X*	X ^{**}			staff very helpful (PSQ-IM T1)
	Staff attitude	X	X	X ^{**}			Great Service (PSQ-IM T2)
APLSS	Overall satisfaction	X ^{**}	X ^{**}		X ^{**}	X ^{**}	Medical staff are very professional / courteous (PSQ-IM T3)
	Satisfaction w/ PCM	X ^{**}		X ^{**}			Very satisfied with the service I received. Improvements have been noted the last 1-2 years (PSQ-IM T3)
	Courtesy and respect	X ^{**}	X ^{**}	X ^{**}	X ^{**}	X ^{**}	Dr. XX is great. She listens and is very detailed (PSQ-FM T2)
	Visit satisfaction			X ^{**}	X		MAJ XX is very thorough and explains in detail my needs and has even found more ailments! (PSQ-FM T3)
Access/continuity							Appointments not given adequate time (EOM-II [®] FM T-3)
PSQ	Access and convenience		X		X	X	No appointments available have to find way to have see anyway despite the level of acuity for fear of negative ICE

	Time spent with PCM			X	X	Comment (EOM-II [®] IM T-2)
ICE	Access to care		X**			Same day appointments are hard to get (PSQ-FM T-1)
	Timeliness	X	X**			The appointment line is always busy and the call back option have not worked for me yet (PSQ-FM T-2)
	Referral to specialty	X	X**			Very difficult to see my PCM! (PSQ-FM T1)
APLSS	Time to scheduled visit			X*	X*	Have had 3 different PCM's in last year (FM T2)
	See PCM when needed					They always look like they actually love their work (PSQ-FM T3)
	Wait time in clinic	X**			X**	Love the extended clinic hours. 4-17 (PSQ-IM T-1)
Other	PCM by name	X**	X	X**	X	Ever since being provided with the "white teams" contact phone numbers, I have had quick response to all my inquiries (PSQ-IM T2)
	PCM by team	X	X	X	X	Every time I visit – which is infrequent my primary care team changes. (PSQ-IM T3)
<u>Quality of care</u>						
	Mammogram			X**	X**	Too many changes in past six months (EOM-II [®] FM, T-3)
	Long term asthma medication	X	X	X	X**	Everyone on staff here is very compassionate toward patients and other staff (EOM-II [®] IM T-1)
	A1c testing					In some cases a lack of equipment and support staff has made it very difficult to provide the quality care I feel we should be able to provide (EOM-II [®] IM T2)
	A1c ≤ 9					
	LDL ≤ 100			X**	X**	some of the young doctors need better training (PSQ-IM T1)
	Cervical screening	X**	X**	X**	X**	The nurse taking my vitals was courteous and knowledgeable (PSQ- IM T2)
	Colorectal screening	X**	X**	X**	X**	
	Chlamydia screening					My health care team is phenomenal! (PSQ-IM T3)
	Adult pneumovax					Nurse who gave me a flu shot today did not tell me her name or did not ask for my identity (PSQ-FM T1)
						I am a retired RN of 33 years – I've lived all over the United States and have never had better care or need more efficient health care providers (PSQ- FM T2)
						Very friendly nurse family oriented (PSQ-FM T3)

Note: X moved in right direction and met target; *metric improved over time but did not achieve target e.g. green, 85%, or 95%;

**metric worsened over time but target was met during the timeframe

Relationship of current findings to previous findings

In March 2010, the Army Nurse Corps began implementing a professional practice model to improve clinical practice, quality of care, patient outcomes, and solidify a culture of evidence-based practice across the Corps, focusing on inpatient units first. At the time this project began evidence from the literature (American Association of Colleges of Nursing, 2002; Hoffart & Woods, 1996; Institute of Medicine, 2003; Aiken, Clarke, & Sloane, 2008; Lundmark, 2008) and data from Tripler's inpatient units (A.I.Corulli, personal communication, August 2009) indicated that professional practice models improved staff satisfaction and patient outcomes. Over half the metrics tracked in this project improved over time or achieved/maintained target goals by time three. While these results were not as robust as hoped for, both clinics made progress overall in the right direction. When collapsed over time, FM metrics were at target more often than IM. This is consistent with the literature in that professional staff satisfaction is associated with more positive patient outcomes.

Effect of problems or obstacles on the results:

Military and personal obligations affected data collection and analysis. Between T1 and T2, COL Trego moved to Germany and LTC Siaki was deployed. LTC Siaki re-deployed immediately prior to T3 data collection of the EOM II[®] and PSQ-18. In June 2012, before T3 data for HEDIS, ICE, and APLSS was available, LTC Siaki and Ms. Byrne relocated to Joint Base Lewis-McChord and Arizona respectively. Coordinating work schedules and availability across five time zones (Boston, Hawaii, Germany, Arizona, and Washington) delayed qualitative data analysis completion by more than six months.

Two major events affected this project that were beyond the influence of study personnel. First, the Army began changing over to a medical home model (PCMH). Changing to a PCMH involved restructuring staffing into teams, realigning positions with duties/responsibilities described in the PCMH model, physical construction to the clinic layout, notifying patients of the changes in providers and the way business was being conducted (e.g. what to expect from a PCMH), taking on the arduous process of becoming a certified PCMH, and opening outlying clinics. Philosophical underpinnings of both the PCMH and PPM focus on better patient outcomes by optimizing care and professional practice. Theoretically, the two models are quite compatible. Clinically however, challenges associated with implementing both systems simultaneously introduced significant change and turbulence to the clinics.

Second, the PPM also changed in response to the ANC's efforts to both improve the PPM and provide Army nurses with an overarching philosophy of professional practice that informed the full spectrum of nurses from novice to expert, bedside clinician to commanders. The PPM was no longer the central focus but part of an overall philosophy of care. The PPM name changed to the Patient CaringTouch System (PCTS), EBP was re-emphasized, and the design of the elements of the PPM changed. For example, the concept of shared governance and a lead RN was retained, but roles, responsibilities, job descriptions, and charters changed several times. Currently the PCTS is in sustainment mode.

Other challenges faced by staff that potentially affected staff satisfaction included frequent leadership changes, staff turnover, and financial constraints including a hiring freeze. For example, FM had two different Clinical Nurse Officers in Charge (CNOIC) while IM had four different CNOIC's over the three data collection points. Both clinics were authorized nursing positions but were unable to fill them in a timely manner due to a system wide hiring freeze.

Qualitative data reported earlier, support these observations. Specifically, staff commented on change, communication, and lack of resources such as adequate staff, all of which are recognized elements of work turbulence (Jennings, 2008). Internal Medicine clinic experienced more turbulence than FM, possibly explaining the lower EOM II[®] scores in IM. Encouragingly, both clinics improved or maintained at least 50% of metrics in target.

Several other issues also affected the study. Two surveys, APLSS and ICE are collected at the MEDCOM level and reported back to the clinic in quarterly intervals. Results usually are 1 or 2 quarters behind. For example, data collected in January may not be available to the clinics until June or September. When T3 ICE data were received from the organization, more than six months had passed. By then, it was too late to encourage completion of the surveys in IM. Both clinic nursing leadership and the department that collates and distributes the results were contacted to verify the low numbers. The number of ICE surveys received at T1 (FM n=1350; IM n=618) was significantly different from T2 (FM n=1090; IM n=47) and T3 (FM n=11086; IM n=12).

A similar problem occurred with the EOM II[®], with most surveys collected at T1 (FM n=18; IM n=24) compared with T2 (FM n=14; IM n=19) and T3 (FM n=12; IM n=7). Study personnel, Ms. Byrne in particular, recruited several times in each time period, stressed the anonymous nature of the survey, engaged nursing leadership at each clinic, increased study personnel presence in the clinics, sent weekly emails to key personnel in each clinic, reassessed data collection processes in an iterative fashion, reviewing with project mentor Dr. Lusardi as needed, and provided refreshments during the collection times however no further surveys were collected. On the other hand, staff from both clinics sought out study personnel asking to speak anonymously. These comments were similar to written comments in that leadership style, communication, change, ineffectiveness of UPCs, and feeling as if they were not practicing to their full potential influenced job satisfaction levels and morale.

One item had a neutral effect but did require an amendment during the study. Open communication was maintained from pre-submission development through analysis with the statistician. In collaboration with the statistician Dr. Glaser, a repeated measures design was originally planned. However, this was not feasible due to the anonymous nature of the three patient surveys. LTC Siaki and COL Trego discussed this on several more occasions with Dr. Glaser. LTC Moore revisited this issue with Dr. Glaser after LTC Siaki deployed. The design was changed to a 2x3 factorial design. This simplified data collection, analysis, and retained the evidence-based nature of the project. Trying to track contact information of participants for a repeated measures design would have necessitated approval from an Internal review Board to collect personally identifiable information and delayed the project.

Limitations

Limitations were identified prior to and during this evidence-based project. Known limitations included the total sample size of RNs in both clinics with LPNs, medics, and medical technicians making up the majority of the nursing staff, the impending implementation of the PCMH, frequent staffing turnover due to military operations, and availability of staff satisfaction surveys developed for multiple levels of nursing staff in ambulatory clinics. Faculty at a TSNRP sponsored grant camp recommended the revised Nursing Work Index (NWI) to measure staff satisfaction rather than the planned instrument. When the authors were contacted they recommended using the updated, revised instrument renamed the Essentials of Magnetism II (EOM-II[®]). This instrument has been used with RNs on inpatient and outpatient units but not with other levels of nursing staff. However the team decided to use the EOM-II[®] for several

reasons: 1) Recommendation of TSNRP grant camp faculty; 2) A relative lack of comparable instruments for non-RN nursing staff; 3) The EOM-II[©] focus on professional practice; and 4) The ANC recognizes the important contributions to patient care from each area of its triangle: Officers (RNs), Enlisted (LPNs, medics, and other unlicensed personnel), and civilians (all levels). Midway through the project, study personnel reviewed the literature, contacted the EOM-II[©] authors, and the American Nurses Credentialing Center (ANCC). As before, no other instrument measuring professional job satisfaction for different levels of nursing staff were identified.

Limitations identified during the course of the project included a delay in forward momentum in both clinics of optimal functioning of the UPC due to changes in leadership focus and personnel, the emphasis on implementation of the PCMH, changes in the metrics (APLSS questions and pneumovax), the psychometric properties of the PSQ-18, and low sample sizes at T2, and T3 for multiple metrics.

Psychometric properties of the PSQ-18 are concerning in that the highest coefficient alpha was obtained for Technical Quality ($\alpha = .709$) followed by Accessibility and Convenience ($\alpha = .689$). The rest were $\leq .623$. Between T2 and T3, LTC Siaki and Ms. Byrne RA, revisited the PSQ literature. Two studies that also altered or deleted subscales of the PSQ-18 reported low psychometrics (Ricci, 2012; Stewart, Kroth, Schuyler, Bailey, 2010) as noted in table 7. Given that, in part, alpha is a function of the number of items; unless there is a substantive correlation between two items, a two-item scale will tend to manifest lower reliability scores. After reviewing the literature and conferring with the statistician, an ad-hoc analysis using exploratory factor analysis, reflected a two factor solution similar to that obtained by Rubio, Pearson, Clark, and Breitkopf (2007). Specifically, the items aligned along a positive or negative axis, indicating satisfaction or dissatisfaction.

Implications for these values is that in the context of significance testing, measurement error may compromise the power of the analysis (hence, culminating in inflated Type II error = false negative findings). Additionally, there are no hard and fast rules for what constitutes an "acceptable" reliability score. As it depends upon the use and intent of the instrument/scale, many have cited .7 as acceptable (D. Glaser, personal communication, August 2012). However, again, .7 may be problematic if the intent is to use the instrument for individual decisions (in that case an α of .8 may be deemed to be minimally acceptable) However, the intent of this project was to improve overall satisfaction, access, and continuity in two local ambulatory clinics.

Table 7

Reliability values from selected studies using a modified PSQ-18

	Coefficient Alpha		TSNRP: HU0001-10-1-TS18			
	Marshall* et al 1994	Stewart et al 2009	Ricci, 2012	Siaki , 2012	Standardized Alpha	Average Item Intercorrelation
General Satisfaction	.75	.58	.59	.62	.632	.462
PSQ-18 subscales						
Technical Quality	.74	.77	.57	.71	.718	.389
Interpersonal Manner	.66	.57	.48	.44	.449	.289
Communication	.64	.64	.27	.45	.478	.314
Time Spent with Doctor/Provider	.77	.67	.76	.56	.562	.390
Accessibility / Convenience	.75	N/A	.57	.69	.695	.362
Financial	.73	N/A	.67	N/A	N/A	N/A

*Note: * original developer of PSQ-18*

Conclusion

Professional practice models facilitate staff satisfaction, the design and delivery of optimal care, and improve patient outcomes (AACN, 2002; Aiken, Clarke, & Sloane, 2008; Hoffart & Woods, 1996; Girard, Linton, & Besner, 2005). Family and Internal Medicine outpatient clinics at Tripler Army Medical Center implemented a nursing PPM guided by the Iowa Model of Evidence-Based Practice during 2009-2012. To this team's knowledge, this is the first EBP project looking at outcomes associated with a military PPM. Although results from this project were not as robust as those reported in civilian hospitals and inpatient settings, they were encouraging nonetheless. Essential elements of the PPM identified in the literature and by subject matter experts were readily apparent despite significant work turbulence. For example, despite limitations in space, equipment, staffing, and time, nursing staff, guided by the PPM, continued to focus on access, quality of care, and communication; demonstrating their commitment to professional values and ethics and interdisciplinary collaboration. Qualitative data also indicated that nursing staff recognized leadership support and the importance of the UPCs/shared governance to quality practice, despite feeling overworked and underappreciated.

Results from this project align with evidence in the literature regarding the importance and effect of staff satisfaction on patient satisfaction, quality care, and outcomes. Negative effects of work turbulence e.g. military operations, changes to the PPM, the structure and function of the clinics themselves, and implementation of the PCMH, emerged in all metrics. Although this EBP project was not designed to test a hypothesis or produce generalizable knowledge, opportunities for improvement emerged that are worth noting.

One, nurse-sensitive optimal care indicators and outcome measures for outpatient clinics are not as well defined as inpatient metrics although the ANA and the American Academy of Ambulatory Care Nursing (AAACN) have workgroups currently focusing on this issue. Duties and responsibilities of nursing staff in a PCMH differ somewhat from traditional outpatient settings. Reasons for high staff turnover rates and timely replacements differ in military versus

civilian organizations. Thus the outcome measures chosen for this project, while practical may not have been the best fit in this context.

Two, the ANC actively promotes nursing staff at all levels to work to the full extent of their training and education. The majority of work regarding professional practice and patient outcomes has been focused on inpatient RNs in civilian settings. More research and EBP projects are needed to define nurse-sensitive optimum care indices for military and civilian ambulatory clinics and identify important contributions of non-RN staff in both traditional and PCMH models. Instruments to assess healthy work environments for non-RN staff is another area of opportunity.

Three, the ANCs PPM has matured into the PCTS, a comprehensive, all encompassing philosophical approach to professional practice. As noted above, research and EBP projects evaluating the short and long term effects of this significant paradigm shift and the role in models of care such as the PCMH across all military services, would enhance the ongoing efforts to design and deliver optimum care to military beneficiaries worldwide (figure 8).

Last, significant challenges due to turbulence from multiple sources targets the need for education and training for leaders and staff with regards to change management. Likewise, education and training targeting PPM elements: effective communication, autonomy, and interdisciplinary collaboration, in the spirit of the IOM report on nursing would be beneficial.

Figure 8: Patient and Family Centered System of Care and Patient CaringTouch System



Significance of Study or Project Results to Military Nursing

In 1999 the Institute of Medicine (IOM) published a sobering report outlining grim statistics related to the delivery of suboptimal healthcare. One key strategy recommended by the IOM to improve the quality of care and patient outcomes focused on translating research findings into evidence-based clinical practice. Florence Nightingale used this critical approach to change the professional standing of nurses, the quality of nursing care delivered, and saved lives. A decade or more before the IOM report, the American Nurses Credentialing Center (ANCC) validated the importance of professional practice models to optimal patient outcomes. These models provide the scaffolding that shape work cultures, support professional nursing values, improve nurse satisfaction and retention, patient satisfaction. For more than 100 years, the ANC has maintained a commitment to professional excellence and proactively initiated strategies that facilitate best patient outcomes. From this perspective, nursing leaders at TAMC systematically evaluated the literature and sought expert consultation for evidenced-based professional practice models. A PPM that emphasized expert differentiated clinical practice, proactive leadership, and interdisciplinary teamwork was successfully implemented on the inpatient wards at TAMC. Based on results, TAMC began implementing the PPM in outpatient clinics, a first in military healthcare facilities. Despite significant organizational and clinic level turbulence, both clinics maintained or achieved target goals for about 50% of the tracked metrics. While many of the metrics did not achieve statistical significance, results trended in the direction expected based on current evidence regarding effects of professional practice models. Overall goals of EBP projects grounded in evaluation science are to assess strengths and weaknesses of locally implemented processes or projects. No attempt at creating generalizable knowledge was made. Pilot testing of EBP projects prior to unit or system-wide implementation is encouraged. Based on that perspective, this project was successful in that several opportunities for improvement surfaced and both EBP and research recommendations can be offered. Specific EBP recommendations include:

1. Now that the PCTS is in sustainment phase across the ANC, continue to track and analyze currently identified nurse-sensitive quality of care and outcomes data locally and at selected facilities system wide. This data can be used to identify specific areas needing improvement related to the PCTS, the local organization, or the system-at-large.
2. Clarify the synergistic nature of the PCMH and the PCTS for both staff and leadership and implement programs to manage change.
3. Differentiated practice levels within both the PCMH and the PCTS continue to need better clarification for both leaders and staff.
4. Quantitative and more in-depth qualitative data in the form of focus groups will provide the necessary detail needed to achieve the previous three recommendations.
5. Data from these recommendations can be used to develop similar PCTS models for military nurses across the services.

Research recommendations include:

1. Develop/modify an instrument to measure professional job satisfaction for all levels of nursing staff consistent with the current composition of the ANC. This instrument ultimately would be useful across military services and in other healthcare organizations that rely on non-RN care providers.
2. Evaluate the effects of PCTS using a multilevel modeling/ nested hierachal statistical model to assess non-provider (RN, LPN, medics) team effects on currently known ambulatory quality of care, access, continuity, and satisfaction indices.

3. Identify/validate/develop nursing-sensitive indicators of ambulatory quality of care, access, continuity, and satisfaction indices that will improve patient outcomes for all military beneficiaries irrespective of services similar to the MILNOD data.
4. Validate the modified PSQ-18 for all military beneficiaries service immaterial and other similar populations for which a modified instrument (e.g. deleting the financial subscales) is more appropriate.

Since this project began, the PPM has evolved into an overarching philosophy of care and implemented across all ANC venues. These are the first known reported results of the effects of the PPM on nurse-sensitive staff and patient outcome measures. Projects such as this highlight the importance of EBP and research efforts to improve practice, facilitating nursing staff at multiple levels to work at the top of their scope, to make sustained progress to achieve optimal outcomes for patients, to continue the critical work Nightingale started over 100 years ago; to sustain the ANC mission of fostering excellence in military nursing care.

Changes in Clinical Practice, Leadership, Management, Education, Policy, and/or Military Doctrine that Resulted from Study or Project

To date, results of this EBP project have not produced local or system-wide changes.

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Summary of Dissemination		
Type of Dissemination	Citation	Date and Source of Approval for Public Release
Podium Presentations	Siaki, L.A. (2013) Patient and Staff Satisfaction Following Implementation of a Professional Practice Model. (Seattle Nursing Research & Evidenced Based Practice Symposium, January 2013, Podium, peer reviewed).	PAO was received prior to each presentation through Madigan Army Medical Center
	Siaki, L.A., (2014). Professional nursing practice: optimizing ambulatory healthcare (Western Institute of Nursing Research, Podium, peer reviewed).	
Poster Presentations	Siaki, L. A., (2010). Professional Practice Model in a Military Ambulatory Care Setting (25 th National American Academy of Nurse Practitioners Conference, June 2010, Poster, peer reviewed).	PAO was received prior to each presentation through Tripler Army Medical Center
	Siaki, L. A., (2011) Optimizing Healthcare: Professional Practice, the Nurse Corps System of Care, and the Medical Home. (21 st Annual Asia Pacific Military Medicine Conference, May 2011, Sydney, Australia. Poster, peer reviewed).	
Publication	Pending development	

Reportable Outcomes

Reportable Outcome	Detailed Description
Applied for Patent	
Issued a Patent	
Developed a cell line	
Developed a tissue or serum repository	Not Applicable
Developed a data registry	

Table 7**Recruitment and Retention Table**

Recruitment and Retention Aspect	Number Staff		Number Patients	
	FM	IM	FM	IM
Subjects Projected in Grant Application	20-25	20-25	500/week	
Subjects Available	17	24	500/week	
Subjects Contacted or Reached by Approved Recruitment Method				
	T1	17	24	200
	T2	14	19	250
	T3	12	7	300
Subjects Screened		19	24	--
Subjects Ineligible		0	0	0
Subjects Refused/unavailable i.e. leave, military training	T1	0	0	
	T2	4	2	N/A
	T3	5	13	
Human Subjects Consented		Completed survey indicated consent to participate		
Subjects Who Withdraw		N/A – anonymous survey		
Subjects Who Completed Study	T1	17	24	160
	T2	14	19	194
	T3	12	7	228
Subjects With Complete Data		57-89		1153-1184
Subjects with Incomplete Data	EOM	Question with the most missing data was level of education (n=37). All other questions n=0-5.		
	PSQ	Varied by question – n=36 - 67(3 - 5.5%)		
APLSS/ICE	No missing data – received in aggregate format			

Table 8
Demographic Characteristics of the Sample

Characteristic		N (%)
Staff - Clinic		
	FM	44 (46.8%)
	IM	50 (53.2%)
Highest level of education*		
	MSN	1 (2.7%)
	BSN	10 (27%)
	Diploma	6 (16.2%)
	ADN	4 (10.8%)
	Other	15 (40.5%)
Years of experience*		n=32, 6.97 years (SD = 7.15)
Shift worked*	8/10 hour days	34 (89.5%)
	8/10 evenings	4 (10.5%)
Patients		
PSQ**		
	Clinic	582(47.7%)
	IM	638 (52.3%)
	Time 1	373 (30.6%)
	Time 2	405 (33.2%)
	Time 3	442 (36.2%)
Times seen in clinic past 6 months		
	1-2	491 (43.7%)
	3-4	393 (35%)
	5 or more	239 (21.3%)
	Missing	97 (8%)
Know assigned healthcare team		
	Yes	798 (69.9%)
	No	359 (31%)
	Missing	63 (5.2%)
Know PCM's name		
	Yes	1037(89%)
	No	128 (11%)
	Missing	55 (4.5%)
Know primary nurse's name		
	Yes	302 (26.3%)
	No	847 (73.7%)
	Missing	71(5.8%)

*Time one data only as multiple staff completed surveys at all three time periods

** Aggregated across time

Final Budget Report